

[illegible]

The screenshot displays the EASI Desktop EASI Workspace [List Panel LANDSCAPE] window. The interface is divided into two main panes. The left pane shows a list of documents with columns for Drafts, Pending, Active, and a list of document titles. The right pane shows a detailed view of the selected document, including fields for Title, Current OR, Current Xref Retrieval, and Inventor. The bottom status bar shows 'Ready' and various icons.

**Left Pane (List Panel):**

- Columns:** Drafts, Pending, Active, List, Browse, Queue, Clear
- Search:** DB: USPA:USPUB
- Default operator:** OR
- Document List:**
  - L1: (29379) ("134"). CLAS.
  - L2: (45757) ("204"). CLAS.
  - L3: (28965) ("205"). CLAS.
  - L4: (87542) ("427"). CLAS.
  - L5: (44256) ("118"). CLAS.
  - L6: (3620) pressure near5 (alarm or alarms)
  - L7: (16) 16 and 11
  - L8: (25) 16 and 12** (Selected)
  - L9: Failed
  - L10: Saved
  - L11: Favorites
  - L12: Tagged (0)
  - L13: UDC
  - L14: Queue
  - L15: Trash

**Right Pane (Detailed View):**

- Title:** 16 and 12
- Current OR:** Current OR
- Current Xref Retrieval:** C
- Inventor:** S C 3

**Bottom Status Bar:** Ready

Document ID	Pages	U	S	O	P	Kind Codes	Sort
1 US 6432283 B1	11						USPAT
2 US 6274009 B1	19						USPAT
3 US 5690797 A	18						USPAT
4 US 5578199 A	20						USPAT
5 US 554276 A	20						USPAT
6 US 5393416 A	20						USPAT
7 US 5380419 A	9						USPAT

US-PAT-NO: 5578199

DOCUMENT-IDENTIFIER: US 5578199 A

TITLE: Apparatus for maintaining a stable bath for an autodeposition composition by periodically separating particular metal ions from the composition

----- KWIC -----

## Detailed Description Text - DETX (29):

Switch SW5 is designated as an "EMERGENCY STOP" switch. When the pushbutton 190 of this switch is depressed, the electrical connection between associated contacts "a" and "b" is broken, and the switch SW5 mechanically maintains this position. Controller 127 is programmed to respond to the operation of the emergency stop switch SW5 by first checking to see if the switch has been manually returned to its inoperative position by being pulled outward, in which case if a treatment cycle had been interrupted, that cycle will be resumed from where it was previously interrupted. However, if controller 127 determines that the "EMERGENCY STOP" switch SW5 remains activated, system operation will be terminated, but the system will not be reset. Next, all alarms (to be described in detail below) will be reset except for outlet pressure low alarm 160, 160', high delta pressure alarm 161, 161', no pump flow alarm 164, 164', and valve failure alarm 163, 163'. Subsequently, if the "EMERGENCY STOP" switch SW5 is deactivated, controller 127 will then resume the cycle of operation previously interrupted, as mentioned earlier.

## Detailed Description Text - DETX (128):

Test Mode 1 provides for energizing lamp 160, and lighting backlit panel display 160', if used, for indicating "OUTLET PRESSURE LOW". As previously explained, this alarm indicates that the pressure measured in the line between filter F2 and TV-1 is low, meaning that the filter F2 is clogged and must be changed. The alarm is energized through sensing by controller 127 of the pressure signal PR2 changing state, such as going from +5 volts to zero volt, for example, indicating a low outlet pressure. The steps involved in this first test mode are as follows:

## Detailed Description Text - DETX (204):

Note that as indicated above, for resetting visual alarms provided in the system, as discussed above, alarms associated with liquid levels of tanks T1, T2, and T3, if used, are automatically reset upon restoration of the level of liquid in the associated tank. However, pressure alarms are reset by first inactivation, followed by activation of the "EMERGENCY STOP" switch SW5. Also, the valve alarms can only be reset by placing the system in its inactive state, and servicing the valves, as indicated in the word flowcharts given above.

Current US Class - CLAS (2):

204

## UNITED STATES PATENT

Kozak et al.

(11) Patent Number: 5,578,199

(45) Date of Patent: Nov. 26, 1996

(54) APPARATUS FOR MAINTAINING A STABLE BATH FOR AN AUTODEPOSITION COMPOSITION BY PERIODICALLY SEPARATING PARTICULAR METAL IONS FROM THE COMPOSITION

(75) Inventors: William C. Kozak, Hatfield; Joseph C. Topping, North Wales, both of Pa.

(73) Assignee: Henkel Corporation, Plymouth Meeting, Pa.

(\*) Notice: The portion of the term of this patent subsequent to Jan. 26, 2013, has been disclaimed.

(31) Appl. No.: 231,075

(22) Filed: Nov. 7, 1994

## Related U.S. Application Data

(62) Division of Ser. No. 8,956, Jan. 26, 1993, Pa. No. 5,393, 416.

(51) Int. Cl.<sup>6</sup> B01J 47/02; B05D 1/18; B05D 7/14

(52) U.S. Cl. 210/66.1; 210/143; 210/167; 210/269; 204/480; 205/99; 118/602; 118/400; 118/429

(58) Field of Search 210/662, 670, 210/677, 681, 688, 696, 739, 746, 88, 89, 108, 138, 142, 143, 263, 269, 275, 900, 96.1; 118/600, 602, 400, 429

## References Cited

## U.S. PATENT DOCUMENTS

2,624,191 2/1953 Sad  
 2,938,868 5/1960 Carlson et al.

(List continued on next page.)

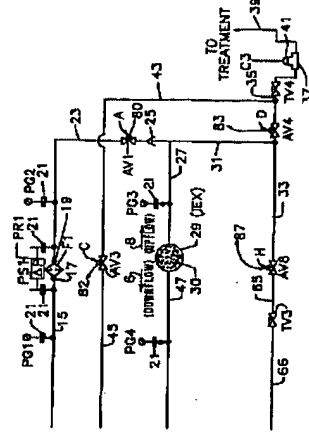
## FOREIGN PATENT DOCUMENTS

2017026 4/1991 Canada  
 0028633 7/1973 Japan  
 0079197 5/1982 Japan

## ABSTRACT

A system automated for providing at least periodic removal of metal ions and contaminants from a chemical bath, consists of a microprocessor programmed for controlling fluid circuits of pumps and valves, for in one state of operation circulating a first predetermined quantity of the chemical bath from a first tank, through an ion exchange column, and back to the first tank; for in a second state of operation circulating deionized water from a second tank into the IEX column for displacing residual chemical bath therefrom for return to the first tank; for in a third state of operation circulating deionized water through the IEX column and discharging the rinse water from a waste port, for in a fourth state of operation circulating regenerate acid through the ion exchange column, and discharging the used acid from a waste port; for in a fifth state of operation circulating deionized water through the IEX column for rinsing acid regenerate therefrom and discharging the same out of a waste port; and for in a sixth state of operation circulating chemical bath into the IEX column for displacing residual rinse water therefrom, and discharging the same out of the waste port, in preparation for a cycle of treatment of the chemical bath.

11 Claims, 4 Drawing Sheets



Document 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US-PAT-NO: 5234563

DOCUMENT-IDENTIFIER: US 5234563 A

TITLE: Electrolytic ionized water producer of a continuous type

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## Brief Summary Text - BSTX (8):

In the case of conventional apparatus, when scale is being removed, if the energizing period of time in the reverse polarity is too short, a sufficient rinse is not performed, and if the period of time is too long the scale can adhere to the other electrode causing a reverse effect, so that a specified total quantity of water to be supplied is set, and when the quantity of water reaches the set value, even while water is being supplied, the polarity of the applied voltage is reversed for scale removing operation, and the water supply is stopped issuing an alarm to the user. Therefore, even when a small quantity of water is needed, the user is required to perform a complicated operation such as to stop supplying water once and after that to start supplying water again. Since the polarity is automatically reversed while water is being supplied, if the operation is stopped late, acid ionized water generated by the reversal of polarity is mixed with the alkaline ionized water. The reverse energizing period of time for the reversal of polarity depends on the period of time till a user stops using water, so that it is difficult to secure a fixed period of time for reverse energizing operation. Therefore, trouble can occur caused by the uncertain period of time for reverse energizing operation. There can be another problem that since the ionized water producer is provided with a pressure switch as a means for integrating the quantity of water, and an alarm means, and so on the configuration can be a complicated one.

Current US Class - CLASS (1):

204

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3

scale can be removed properly in every water supplying operation.

## BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawing wherein: FIG. 1 is a schematic representation showing the outline of the whole system of an embodiment of a continuous type electrolytic ionized water producer according to the present invention;

FIG. 2 is a block diagram showing a control system of an embodiment of a continuous type electrolytic ionized water producer according to the present invention;

FIG. 3 is a chart showing the time chart of the operation of ionized water production and the scale removing operation.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

An embodiment according to the present invention will be explained based on the drawings in the following. The outline of the whole of a continuous type electrolytic ionized water producer will be explained based on FIG. 1. In FIG. 1, 1 is an inlet pipe for introducing drinking water being connected to a city water supply and the inlet pipe 1 is connected to an electrolytic bath 2. The electrolytic bath 2 is of a closed type, and the interior of the bath is partitioned into 2 compartments, 2a and 2b by a partition 3, and the compartments house negative electrode 4 and a positive electrode 5, respectively. A discharge pipe 6 for alkaline ionized water is provided in communication with the compartment 2a having the negative electrode 4, and a discharge pipe 7 for acid ionized water is provided in communication with the compartment 2b having the positive electrode 5. Each of these discharge pipes, 6 and 7, is provided with a faucet 8 or 9, which makes it possible to take off alkaline ionized water or acid ionized water separately. The inlet pipe 1 is provided with a flow rate sensor 10 for detecting water supply or water supplying period of time of alkaline ionized water or acid ionized water. The flow rate sensor 10 has, for example, rotatable impellers fixed with magnet pieces which produce a pulse signal, and the pulse signal is processed electrically for detecting water flow and the period of time of water flow. An electric control system for applying a voltage will be explained in the following. 13 is an AC power source, and it is connected to the primary side of a transformer 16 through a power switch 14, which is ON or OFF responsive to an output signal of a control circuit 30, and a fuse 17, and the secondary side of the transformer 16 is connected to a rectifier circuit 19. A positive electrode and a negative electrode on the DC voltage output side of the rectifier circuit 19 are connected to 2 movable contacts, 22a and 22b, of a relay 21 for reversing polarity through a smoothing capacitor 20. A fixed contact 22a, which is 1 of 2 fixed contacts, 22a and 22b, of the movable contact 22a of the positive electrode is connected to the positive electrode 5, and the other fixed contact 22b is connected to the negative electrode 4. A fixed contact 23a, which is 1 of 2 fixed contacts, 23a and 23b, of the movable contact 23a of the negative electrode is connected to the negative electrode 4 and the other fixed contact 23b is connected to the positive electrode 5. These 2 movable contacts, 22a and 22b, normally about the fixed contacts 22a and 22b,

as shown in the drawing, under the force of a spring, and they are switched to the reverse connecting positions shutting the opposed contacts, 22a and 22b, by a reversing signal from the control circuit 30.

The control system of the control circuit 30 will be explained based on FIG. 2. The control circuit 30 comprises a water supply detection means 31, a zero flow water supply detection means 32 and an integration means for integrating the water supplying period of time 34, to which signals from the flow rate sensor 10 are input. The water supply detection means 31 detects a water supply when a signal from the flow rate sensor 10 is input continuously for a fixed time, and the water supply detection means 32 detects stop of water supply when a signal from the flow rate sensor 10 has stopped inputting continuously for a fixed time. These detection signals of water supply and zero flow water supply are input to a power supply driving means 33 which outputs a signal for making the power supply switch 14 ON during the water supply.

An integration means for integrating the water supplying period of time 34 inputs to the memory the water supply integrated quantity for the period of time from the input of a water supply detection signal till the input of a zero flow water supply detection signal, and counts the number of pulses in the signal from the flow rate sensor 10, and totalizes and stores a water supplying period of time, T, corresponding to the water supply quantity for all water supplying operations. A signal representative of the water supplying period of time, T, is input to a setting means for setting a scale removing period of time 35 at the start of zero flow water supply, and a scale removing period of time, D, is set corresponding to this water supplying period of time, T. When the water supplying period of time, T, is long, much scale is produced, and the scale removing time, D, becomes long, so that the scale removing time, D, is optimized for every water supplying operation, approximately in the form of a growth function, for the water supplying period of time, T, and the scale removing period of time, D, is set using a setting map. A signal representative of the scale removing period of time, D, is input to a reverse driving means 36 which outputs a reversing signal only for the period of time, D, to the polarity reversing relay 21 for switching the connection to a reverse connection position. A signal for scale removing period of time, D, is also input to the power supply driving means 33 and, only for the period of time D, it outputs an ON signal to the power supply switch 14. The above-mentioned reversing signal is input to a judgment means for determining the conclusion of a scale removal operation 37, and when the reversing signal is stopped inputting continuously for a specified period of time, it judges the conclusion of scale removing operation, and a finishing signal is input to the water supplying period of time integration means 34 and the memory is reset.

On the other hand, as a measure for the case where water is supplied during a scale removing operation, the control circuit 30 comprises a detection means for detecting water supply during a scale removing operation 38 in which a water supply detection signal from the water supply detection means 31 and a reversing signal from the judgment means for judging the finish of a scale removing operation 37 are input, and if a water supply detection signal is input during a period of time in which a reversing signal is being output, a signal for water supply during a scale removing operation is generated.

Doc#	Document ID	Pages	U	S	C	P	Kind Codes	Source
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10	US 4902398 A	21						USPAT
11	US 4852385 A	12						USPAT

US-PAT-NO: 4852385

DOCUMENT-IDENTIFIER: US 4852385 A

\*\*See image for Certificate of Correction\*\*

TITLE: Maintenance device for at least partially automatic cleaning and calibration of a probe containing a measured value transmitter

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## Detailed Description Text - DEX (12):

The rinsing or cleaning operation is started by actuating the control element 98 which constitutes a toggle switch in the illustrated embodiment. The calibrating operation is started by actuating the control element 102 which constitutes a toggle switch in the illustrated embodiment. The directional water control valve 56, which is set to rinsing or cleaning duration of about 1 minute by a time control valve in the control unit A3, is opened; the KINSE indicator 115 (blue) is activated thereby. The setting of the rinsing or cleaning duration to about 1 minute corresponds to the general rule; however, the rinsing or cleaning period can be prolonged if necessary. In addition, the rinsing or cleaning operation or process can be repeated once or several times in the case of heavy contamination. If the rinsing or cleaning operation or process is intended to be repeated, the toggle switch 98 must be placed into the OFF position and thereafter back to the ON position, whereupon the rinsing or cleaning operation is restarted. This procedure is recommended, for example, when the electrode is intended to be stored in the clean condition at the end of the monitored fermentation process. The electrode remains immersed in water after the rinsing or cleaning operation. If the rinsing or cleaning water pressure is insufficient, the red alarm indicator 116 is activated and continues to be activated until the rinsing or cleaning water pressure is increased. Thereafter, the rinsing or cleaning operation must be repeated. The "CALIBRATION" program or calibrating operation is blocked during the time the rinsing or cleaning water pressure is insufficient.

Current US Class - CLASS (1):

204

# United States Patent [19]

## Brinkmann

[11] Patent Number: 4,852,385  
[45] Date of Patent: Aug. 1, 1989

[54] MAINTENANCE DEVICE FOR AT LEAST PARTIALLY AUTOMATIC CLEANING AND CALIBRATION OF A PROBE CONTAINING A MEASURED VALUE TRANSMITTER

[75] Inventor: Heins J. Brinkmann, Frankfurt am Main, Fed. Rep. of Germany

[73] Assignee: Dr. W. Isigold AG, Urdorf, Switzerland

[21] Appl. No.: 15,899

[22] PCT Filed: May 28, 1986

[86] PCT No.: PCT/CH86/00070

§ 371 Date: Jan. 27, 1987

§ 102(e) Date: Jan. 27, 1987

[97] PCT Pub. No.: WO86/07131

PCT Pub. Date: Dec. 4, 1986

[30] Foreign Application Priority Data

May 30, 1985 (CH) Switzerland 2779/85

[31] Int. Cl.<sup>4</sup> G01N 27/30; G01N 27/38; G01D 18/00

[32] U.S. Cl. 73/1 R; 204/401; 204/403

[58] Field of Search 73/1 R; 1 G; 204/401; 204/403, 433, 405, 1 R, 1 T

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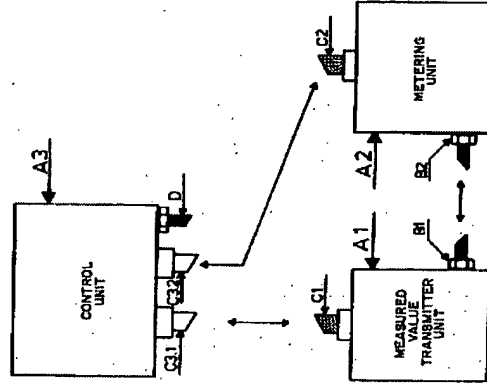
Patent Abstracts of Japan, vol. 6, No. 229, (1107) p. 155; published Nov. 16, 1982, (English Abstract of Japanese Patent Publication 57-132033 dated Aug. 16, 1982).

Primary Examiner—Tom Noland  
Attorney, Agent, or Firm—Werner W. Kleiman

## ABSTRACT

The combination of a measured value transmitter unit, a metering unit and a control unit enables all maintenance measures which become necessary during the course of process monitoring, to be carried out with little expenditure of labor and time and without removing the sensor from the container containing the measured medium. In addition, this combination, in which all functions necessary for carrying out the maintenance can be initiated and/or controlled by pneumatic signals, permits at least partial automation of the maintenance.

11 Claims, 4 Drawing Sheets



**2: EAST - [Default EAST Workspace (Flat Panel LANDSCAPE), wsp: 1]**

**EAST - Database Workspace [East Panel LANDSCAPE] wsp.1**

File View Edit Tools Window Help

☐ Drafts  
☒ Pending  
☒ Active

- L1: (29379) ("134"). CLAS.
- L2: (45757) ("204"). CLAS.
- L3: (28965) ("205"). CLAS.
- L4: (87542) ("427"). CLAS.
- L5: (44256) ("118"). CLAS.
- L6: (3620) pressure near5 (alarm or alarms)
- L7: (16) 16 and 11
- L8: (25) 16 and 12
- L9: (8) 16 and 13

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16 and 13

☐ Print  
☒ Highlight all items reliably

U	P	PT	P	Document ID	Issue Date	Pages	Title	Current OR	Current Xref Retrieval C	Inventor	S	C	3
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20030136686 A1	20030724	6	High volume electrolytic water treatment system and apparatus for maintaining a stable bath for an	205/751	204/276; 205/755;	Herbst, Robert J.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 5578199 A	19961126	20	Apparatus for maintaining a stable bath for an	210/96.1	118/400; 118/429;	Kozak, William G. et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 5069759 A	19911203	8	Pressure switch	205/73		Hodate, Masato	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 4207146 A	19800610	10	Process for testing gases in body fluids for partial	205/782.5	137/2; 204/406;	Kunke, Stefan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 3983017 A	19760928	15	Recovery of metal values from manganese deep sea	205/580	205/589; 423/139;	Szabo, Lester J.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 3857762 A	19741231	7	CONTINUOUS ANALYSIS FOR COPPER CONCENTRATION	205/789.5	436/151; 436/80	Morrow, James J. et al.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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File View Edit Tools Window Help

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21 EAST · [Default EAST Workspace (Flat Panel LANDSCAPE).wsp:1]

The screenshot displays the "EASI - Database EASI Workspace [Easi Panel LANDSCAPE] wfp-1" application. The interface includes a top menu bar with File, View, Edit, Tools, Window, and Help. Below the menu is a toolbar with icons for Drafts, BRS, Pending, Active, Search, List, Browse, Queue, and Data. A central pane shows a list of drafts, each identified by a number (e.g., L1, L2) and a description (e.g., ("134"). CLAS.). To the right, a search results pane displays a list of items, including "L19 not (17 or 18 or 19 or 110 or 111)". At the bottom, a status bar indicates the current document ID, issue date, pages, title, and other metadata.

Doc ID	Pages	U	S	C	SP	Kind Codes	Source
US 5820691 A	18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		USPAT
US 5679173 A	12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		USPAT
US 5637153 A	29	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		USPAT
US 5482063 A	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		USPAT
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US 5441063 A	38	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		USPAT
US 5425385 A	21	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		USPAT

US-PAT-NO: 5425385

DOCUMENT-IDENTIFIER: US 5425385 A

TITLE: Rotary washer spraying system

----- RWIC -----

Abstract Text - ABSTX (1):

A control system for a high-speed rotary washer spraying system designed particularly for plastic returnable bottles automatically regulates each process of the wash spraying system, namely, sequentially feeding bottles from an infed conveyor means, inverting them by a worm/inverter means, receiving and simultaneously rotating each bottle in an inverted position through a plurality of washing, neutralizing and sanitizing treatment zones, and inverting each bottle to its original neck-up orientation for further processing. During the entire process, a programmable logic controller maintains, manages, and controls all pumps, valves, solenoids, and drive motor speeds as required by the process, and also provides for monitoring and adjusting fluid levels, alkalinity/acidity concentrations, and temperatures of the wash and neutralizing solutions. Alarm conditions that may present themselves during the washing, neutralizing, and sanitizing processes are flagged for human intervention, interaction, or acknowledgement. Such alarm conditions are out of range: fluid flow, temperature, pressure, conductivity and/or pH, fluid levels, and carousel and bottle RPM. The control system also includes specialized checks for clogged spray nozzles, and out of position fluid lances.

Brief Summary Text - BSTR (8):

During the entire process, a programmable logic controller maintains, manages, and controls all pumps, valves, solenoids, and drive motor speeds as required by the process, and also provides for monitoring and adjusting fluid levels, alkalinity/acidity concentrations, and temperature of the recirculated wash solution. A machine operator or attendant may view from a centrally located operator interface, all of the above present machine operating and process parameters. Any alarm conditions that may present themselves during the process are displayed and will prompt for human intervention, interaction, or acknowledgement. Such alarm conditions are: out of range, fluid flow, temperature, pressure, conductivity and/or pH, fluid levels, carousel and bottle RPM, and will include specialized checks for clogged spray nozzles, and out of position fluid lances.

Current US Class - CLAS (1):

134

## United States Patent

Kuta et al.

[19]

[11] Patent Number: 5,425,385

[45] Date of Patent: Jun. 20, 1995

## [54] ROTARY WASHER SPRAYING SYSTEM

[75] Inventors: Ken Kuta, Rockford, Ill.; Antonio Fernandez, Danbury, Conn.

[73] Assignee: PepsiCo, Inc., Purchase, N.Y.

[21] Appl. No.: 90,595

[22] Filed: Jul. 12, 1993

[31] Int. Cl.<sup>7</sup> B08B 3/02; B08B 9/08

[52] U.S. Cl. 134/52; 134/57 R; 134/59 R; 134/62; 134/66; 134/80; 134/95.2; 134/95.3; 134/103.3; 134/104.1; 134/113; 134/142; 134/152; 134/153; 134/159; 141/83; 239/71

[58] Field of Search 134/54, 57 R, 59 R, 62, 66, 80, 95.2, 95.3, 103.3, 104.1, 113, 142, 144, 145, 152, 153, 159, 239/71, 141/83

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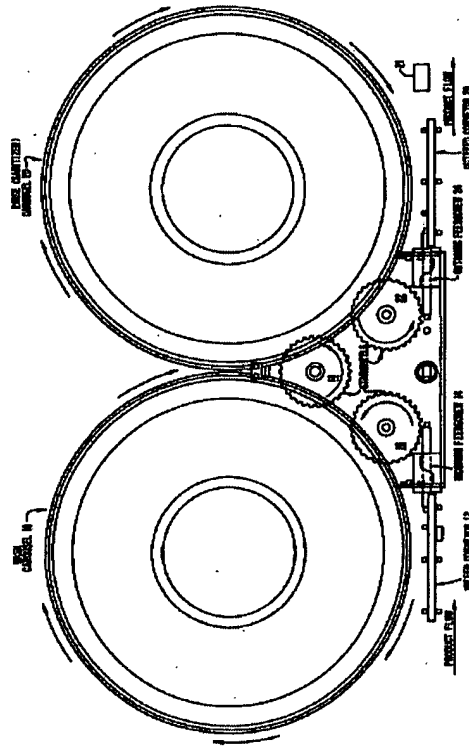
635493 9/1936 Germany ..... 134/66

Primary Examiner—Philip R. Coe  
 Attorney, Agent, or Firm—Scully, Scott, Murphy & Presser

## ABSTRACT

A control system for a high-speed rotary washer spraying system designed particularly for plastic returnable bottles automatically regulates each process of the wash spraying system, namely, sequentially feeding bottles from an infed conveyor means, inverting them by a worm/inverter means, receiving and simultaneously rotating each bottle in an inverted position through a plurality of washing, neutralizing and sanitizing treatment zones, and inverting each bottle to its original neck-up orientation for further processing. During the entire process, a programmable logic controller maintains, manages, and controls all pumps, valves, solenoids, and drive motor speeds as required by the process, and also provides for monitoring and adjusting fluid levels, alkalinity/acidity concentrations, and temperatures of the wash and neutralizing solutions. Alarm conditions that may present themselves during the washing, neutralizing, and sanitizing processes are flagged for human intervention, interaction, or acknowledgement. Such alarm conditions are out of range: fluid flow, temperature, pressure, conductivity and/or pH, fluid levels, and carousel and bottle RPM. The control system also includes specialized checks for clogged spray nozzles, and out of position fluid lances.

38 Claims, 11 Drawing Sheets





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<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 5199639 A	19930406		Shower with a micromotor operated revolving shower	239/11	239/282; 239/394;	Kobayashi, Hiroshi et al.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 4783772 A	19881108		Wristwatch with pressure sensor	368/11	73/754; 968/411;	Umemoto, Toshio et al.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Drafts  
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☐ L2: (29056) ("134").CLAS.  
☐ L3: (1623) pressure near2 alarm  
☐ L4: (7) 12 and 13  
☐ L5: (3536) pressure near5 (alarm or alarms)  
☐ L6: (16) 12 and 15  
☐ L7: (9) 16 not 14  
☐ L8: (59) (water adj pressure) near5 (alarm or alarms)  
☐ L9: (0) 12 and 18  
☐ L10: (45195) ("204").CLAS.  
☐ L11: (28661) ("205").CLAS.  
☐ L12: (86402) ("427").CLAS.  
☐ L13: (43807) ("118").CLAS.  
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☐ Favorites  
☐ Tagged (N)

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	SPSS base	SPSS term	SPSS group	SPSS Tool	SPSS HTML



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US 5882426 A	12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	USPAT
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US-PAT-NO: 3896827

DOCUMENT-IDENTIFIER: US 3896827 A

TITLE: Dish machine monitoring of time, temperature, alkalinity, and pressure parameters

----- KWIC -----

Detailed Description Text - DENX (20):

While not shown in FIG. 2, the control box may conveniently contain means for determining the existence of flow pressure in the fill line to the washing machine. This may be accomplished conveniently by having a flexible plastic tubing from the fill line to a pressure switch located in the control box. A pressure switch designated M3218-4 manufactured by the Hobbs Division of Stewart-Warner Corp. of Chicago, Illinois, has been found to be highly satisfactory for this purpose. The pressure switch may be electrically connected to the alarm system on the face of the control box as shown in FIG. 4. When the pressure switch senses the presence of water flowing in the fill line and the system is operating a light will be turned on on the front of the control box. Alternatively, the pressure switch may be located at the fill line itself, rather than in the control box, and electrically connected with the light on the face of the control box to indicate water flowing in the fill line. The pressure setting for activating the switch is variable between one-fourth to thirty pounds per square inch. I prefer to set the pressure for switch activation at between one-half and three-fourths psi.

Detailed Description Text - DENX (22):

FIG. 3 is a cross section of mixing manifold 56 illustrated in FIG. 2. Additive-containing wash water from tank 28 (FIG. 1) is taken off through sample line 57 at the outlet from pump 26. Referring to FIG. 3, line 57 preferably has a filter 101 to remove large particles from the sample water entering mixing manifold 56. Pressure switch 102 senses, through plastic tube 103, the presence of water flowing in line 57. When water stops flowing in line 57 or a low pressure condition occurs while pump 26 is running, pressure switch 102 activates an alarm system. The alarm system consists of a light on the face of the control panel (FIG. 4) as well as a bell to call immediate attention to the operator that water is not being pumped by pump 26. Lack of pressure in line 57 indicates that there is no water in tank 28 or that excessive foam in tank 28 is such that pump 26 is unable to maintain the water pressure required for efficient operation of the dishwashing machine. Pressure switch 102 is electrically connected through wires 106 and 107 to the bell and light alarm system. The alarm does not sound when the machine is turned off, but only when the wash cycle is operating in station 16. Sample water in line 57 enters mixing manifold 56 through fitting 108 into port 109 and into chamber 111. In chamber 111, the sample water is tested for temperature and alkalinity. Thermostat 59 functions to measure the temperature and switch on a signal light when the temperature of sample water falls below a predetermined level. Conveniently, that level is 150 degrees F. The probe 112 of thermostat 59 also functions as the anode for determining alkalinity. Probe 112 is connected by wire 61 to a sensitivity circuit previously described. The electrode 64 extends into chamber 111 through fitting 113. Electrode 64 is connected to a sensitivity circuit through wire 63 in order to measure alkalinity.

## United States Patent

Robinson

[19]

[11] 3,896,827

[45] July 29, 1975

[54] DISH MACHINE MONITORING OF TIME, TEMPERATURE, ALKALINITY, AND PRESSURE PARAMETERS

[76] Inventor: Norman R. Robinson, 6902

[22] Filed: Aug. 31, 1973

[21] Appl. No.: 393,345

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3,490,467 1/1970 Gore et al. 134/18  
R27,376 5/1972 Pickup 417/477

Primary Examiner—S. Leon Bashore  
Assistant Examiner—Richard V. Fuher  
Attorney, Agent, or Firm—Limbach, Limbach & Sutton

[57]

ABSTRACT

A dishwasher control system for automatically recording the duration of machine operation to determine cost of supplies, service and use. Machine operation is commenced by sensing the pressure of dishes and stopped automatically at the end of the cycle. During operation, the wash water is continuously sampled and checked for low temperature, low detergent and low pressure.

13 Claims, 4 Drawing Figures

## References Cited

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3,122,235 2/1964 Meeker et al. 134/48 X

[52] U.S. Cl. 134/10; 134/18; 134/25 A;

[51] Int. Cl. 134/56 D; 417/477

[58] Field of Search 134/18, 10, 25 A, 25 R;

134/29, 30, 32, 57 D, 58 D, 72, 56 D, 48;

417/474, 477; 58/145 R



Document ID	Page	U.S.	Kind	Code	Source
US 6274009 B1	19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	USPAT
US 4852385 A	12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	USPAT

US-PAT-NO: 4852385

DOCUMENT-IDENTIFIER: US 4852385 A

\*\*See image for Certificate of Correction\*\*

TITLE: Maintenance device for at least partially automatic cleaning and calibration of a probe containing a measured value transmitter

----- KWIC -----

Detailed Description Text - DETX (12):

The rinsing or cleaning operation is started by actuating the control element 98 which constitutes a toggle switch in the illustrated embodiment. The calibrating operation is started by actuating the control element 102 which constitutes a toggle switch in the illustrated embodiment. The directional water control valve 56, which is set to rinsing or cleaning duration of about 1 minute by a time control valve in the control unit A3, is opened; the RINSE indicator 115 (blue) is activated thereby. The setting of the rinsing or cleaning duration to about 1 minute corresponds to the general rule; however, the rinsing or cleaning period can be prolonged if necessary. In addition, the rinsing or cleaning operation or process can be repeated once or several times in the case of heavy contamination. If the rinsing or cleaning operation or process is intended to be repeated, the toggle switch 98 must be placed into the OFF position and thereafter back to the ON position, whereupon the rinsing or cleaning operation is restarted. This procedure is recommended, for example, when the electrode is intended to be stored in the clean condition at the end of the monitored fermentation process. The electrode remains immersed in water after the rinsing or cleaning operation. If the rinsing or cleaning water pressure is insufficient, the red alarm indicator 116 is activated and continues to be activated until the rinsing or cleaning water pressure is increased. Thereafter, the rinsing or cleaning operation must be repeated. The "CALIBRATION" program or calibrating operation is blocked during the time the rinsing or cleaning water pressure is insufficient.

Current US Class - CLAS (1):

204

# United States Patent [19] Brinkmann

[54] MAINTENANCE DEVICE FOR AT LEAST PARTIALLY AUTOMATIC CLEANING AND CALIBRATION OF A PROBE CONTAINING A MEASURED VALUE TRANSMITTER

[73] Inventor: Heins J. Brinkmann, Frankfurt am Main, Fed. Rep. of Germany

[73] Assignee: Dr. W. Isopold AG, Urdorf, Switzerland

[21] Appl. No.: 15,859

[22] PCT Filed: May 28, 1986

[86] PCT No.: PCT/CH86/00070

[86] Date: Jan. 27, 1987

[86] Date: Jan. 27, 1987

[87] PCT Pub. No.: WO86/07151

[87] PCT Pub. Date: Dec. 4, 1986

[30] Foreign Application Priority Data

May 30, 1985 (CH) Switzerland 279/85

[51] Int. Cl. G01N 27/30; G01N 27/38; G01D 18/00

[52] U.S. Cl. 73/1 R; 204/401; 204/403

[58] Field of Search 73/1 R; 1 G; 204/401; 204/403, 433, 403, 1 H, 1 T

[11] Patent Number: 4,852,385  
[45] Date of Patent: Aug. 1, 1989

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4,334,232 6/1982 Morris 432/164

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237942 6/1977 Fed. Rep. of Germany  
2712159 9/1978 Fed. Rep. of Germany  
3110771 11/1982 Fed. Rep. of Germany

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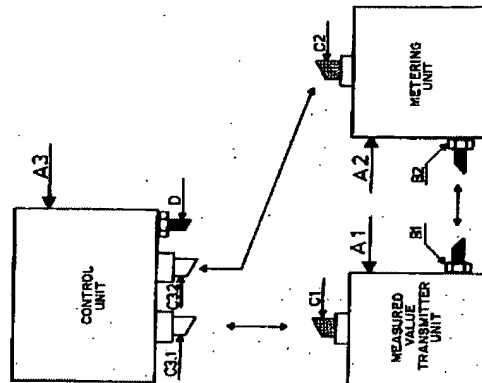
Patent Abstracts of Japan, vol. 6, No. 229, (1107) p. 155; published Nov. 16, 1982; (English Abstract of Japanese Patent Publication 57-132033 dated Aug. 16, 1982).

Primary Examiner—Tom Noland  
Attorney, Agent, or Firm—Werner W. Klesman

## ABSTRACT

The combination of a measured value transmitter unit, a metering unit and a control unit enables all maintenance measures which become necessary during the course of process monitoring, to be carried out with little expenditure of labor and time and without removing the sensor from the container containing the measured medium. In addition, this combination, in which all functions necessary for carrying out the maintenance can be initiated and/or controlled by pneumatic signals, permits at least partial automation of the maintenance.

11 Claims, 4 Drawing Sheets



	Document ID	Pages	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
2	US 6106771 A	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

US-PAT-NO: 4652368

DOCUMENT-IDENTIFIER: US 4652368 A

TITLE: Water filtration system

----- KWIC -----

Detailed Description Text - DPTX (22):  
Second pump system 42 and booster pump 64 are actuated only when a vehicle is passing through the installation to be washed. In a more fully automated system, the pressure gauges described above may be replaced by conventional pressure transducers and associated electronics to provide an audible alarm signal when filter differential pressure rises to a point showing the need for filter cleaning.

Current US Class - CLASS (1):  
134

# United States Patent

Ennis et al.

(11) Patent Number: 4,652,368

(45) Date of Patent: Mar. 24, 1987

## [54] WATER FILTRATION SYSTEM

[75] Inventors: G. Thomas Ennis, Playa Del Rey, Calif.; Robert G. Chilton, Boca Raton, Fla.

[73] Assignee: N/S Corporation, Inglewood, Calif.

[21] Appl. No. 871,085

[22] Filed: Jun. 5, 1986

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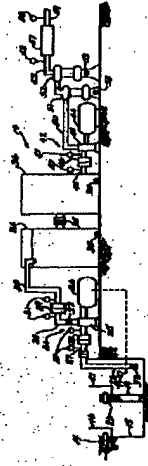
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Primary Examiner—Ernest G. Thekorn  
Attorney, Agent, or Firm—Ochli, Sutton & Thomas

## ABSTRACT

A constant-recirculation filter system for decontaminating and treating wash water in vehicle washing installations and other applications in which water recycling is needed. The elements of the system are selected to avoid need for backwashing operations, thereby enabling use by unskilled personnel. Unrecycled fresh water is used to rinse vehicles, and to provide makeup water to the recirculating system.

11 Claims, 2 Drawing Figures



Doc#	Document ID#	Pages	Fig.	U	S	C	P	Kind	Codes	Source
22	US 5271361 A	8								USPAT
23	US 5038807 A	8								USPAT
24	US 4891115 A	18								USPAT
25	US 4877043 A	10								USPAT
26	US 4852385 A	12								USPAT
27	US 4787348 A	8								USPAT
28	US 4652368 A	7								USPAT

US-PAT-NO: 4852385

DOCUMENT-IDENTIFIER: US 4852385 A

\*\*See image for Certificate of Correction\*\*

TITLE: Maintenance device for at least partially automatic cleaning and calibration of a probe containing a measured value transmitter

----- KWIC -----

## Detailed Description Text - DFTX (8):

The control unit A3 is illustrated in FIG. 4 and contains control elements 94 and 96 for inserting and withdrawing the sensor 6, a control element 98 for switching on and off the rinsing or cleaning system, a control element 102 for requesting the pH value to be set to 7.00, a second request indicator 108 requesting the pH value to be set to, for example 4.01, an ACKNOWLEDGE control element 110, pneumatic indicators 111, 112, 113 and 115 from which the current status of the program course can be read, an LCD display 114 from which the instant value measured by the sensor 6 can be read, an alarm indicator 116 indicating insufficient rinsing or cleaning water pressure, an amplifier 117 for setting the pH value, an alarm indicator 118 indicating an insufficient filling state of the storage vessel or container 60 and/or 62, a CALIBRATION control element 120, a pneumatic CALIBRATION indicator 121, a multipole coupler corresponding to C3.1 in FIG. 1 and compatible with the multipole coupler C-sub.1 of the measured value transmitter unit A1, a multipole coupler corresponding to C 3.2 in FIG. 1 and compatible with the multipole coupler C2 of the metering unit A2, and a signal output corresponding to D in FIG. 1 and which signal output D can be coupled to a central compressed air supply or an additional central process control unit. In addition, the control unit A3 is equipped with two separate inputs which are not illustrated in the Figure, for connection with the temperature compensation resistance which is located in the not-illustrated temperature compensation resistance which is located in the fluid medium to be investigated, as well as a control element 128 for switching from automatic temperature compensation to manual temperature compensation.

## Detailed Description Text - DFTX (9):

In the construction of the heretofore described control unit 43, all or most of the control elements are designed as push buttons. The color of indication is blue, with the exception of the MEASUREMENT indication which appears in green. The alarm indicators indicating insufficient rinsing or cleaning water pressure and/or an inadequate filling state of the first and second storage vessels or containers 60, 62 for the buffer solutions appear red. Further details in this respect follow further hereinbelow in the description of the operation of the exemplary embodiment.

## Detailed Description Text - DFTX (12):

The rinsing or cleaning operation is started by actuating the control element 98 which constitutes a toggle switch in the illustrated embodiment. The calibrating operation is started by actuating the control element 102 which constitutes a toggle switch in the illustrated embodiment. The directional water control valve 56, which is set to rinsing or cleaning duration of about 1

# United States Patent [19]

## Brinkmann

[11] Patent Number: 4,852,385  
[45] Date of Patent: Aug. 1, 1989

[54] MAINTENANCE DEVICE FOR AT LEAST PARTIALLY AUTOMATIC CLEANING AND CALIBRATION OF A PROBE CONTAINING A MEASURED VALUE TRANSMITTER

[73] Inventor: Heins J. Brinkmann, Frankfurt am Main, Fed. Rep. of Germany

[73] Assignee: Dr. W. Ingold AG, Urdorf, Switzerland

[21] Appl. No.: 15,899

[22] PCT Filed: May 28, 1986

[86] PCT No.: PCT/CE86/00070

§ 371 Date: Jan. 27, 1987

§ 102(e) Date: Jan. 27, 1987

[97] PCT Pub. No.: WO86/07131

PCT Pub. Date: Dec. 4, 1986

[30] Foreign Application Priority Data

May 30, 1985 (CH) Switzerland 2797/85

[51] Int. Cl.<sup>4</sup> G01N 27/30; G01N 27/38; G01D 18/00

[52] U.S. Cl. 73/1 R; 204/401; 204/403

[58] Field of Search 204/408, 433, 405, 1 H, 1 T

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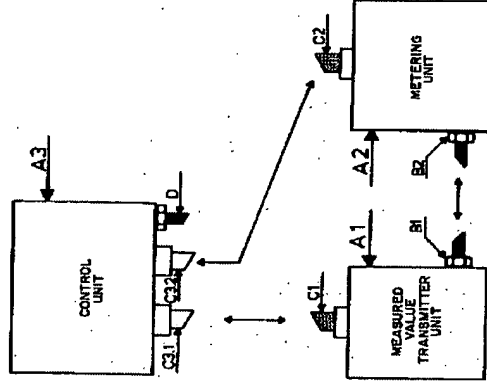
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Primary Examiner—Tom Noland  
Attorney, Agent, or Firm—Werner W. Kleiman

## ABSTRACT

The combination of a measured value transmitter unit, a metering unit and a control unit enables all maintenance measures which become necessary during the course of process monitoring, to be carried out with little expenditure of labor and time and without removing the sensor from the container containing the measured medium. In addition, this combination, in which all functions necessary for carrying out the maintenance can be initiated and/or controlled by pneumatic signals, permits at least partial automation of the maintenance.

11 Claims, 4 Drawing Sheets



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US-PAT-NO: 6333689

DOCUMENT-IDENTIFIER: US 6333689 B1

TITLE: Apparatus and method for water flow fire alarm

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Detailed Description Text - DEXT (23):

FIG. 13 shows the system incorporating the features disclosed herein. The system shown in FIG. 13 is an MPS system, but it could be that instead of incorporating domestic demands, the system could simply supply fire protection needs, in which case it would be more like a standard sprinkler system. A water supply means 10 supplies water through a gate valve 12 and a water meter 14 to the exterior wall 16 of the structure. The water enters the system through a main control valve 18. Preferably, as shown, the main control valve 18 will have a tamper protection means 158 for determining whether the valve is closed, and if so, enunciating a trouble alarm. A pressure gauge is also preferably provided in the system. Water then flows through a combination orifice flow meter/displacement magnetic flow sensor 128. The sensor 128 shown has two normally open Reed switches disposed thereon for detecting flow as indicated by displacement of the moving orifice plate 134, not shown. The first Reed switch 146 is the same as previously disclosed, and enunciates a fire alarm via the fire alarm means 26. Preferably, the Reed switch 146 also activates a system which contacts emergency response personnel, such as fire departments. In addition to the fire alarm Reed switch 146, the present invention incorporates a first stage Reed switch 160. The first stage Reed switch 160 enunciates a first stage trouble alarm 162. Preferably, the first stage trouble alarm 162 is only enunciated within the structure (i.e., emergency response personnel are not contacted). The alarm is created when the domestic usage is excessive. Where the system is used with an MPS, the first stage alarm will cause anyone in the residence to instinctively shut off water, for example a shower they may be taking. As another example, if a resident hears a first stage alarm, and they were washing dishes, they will most likely shut off the sink faucet. This natural reaction to the first stage alarm may reduce the water flow demand below the level where the first stage alarm enunciates, eliminating the alarm condition. As can be seen in FIG. 13, the first stage Reed switch 160 is displaced a slight distance, shown as delta "d," toward the inlet 134 of the flow sensor 128. Thus, as the moving orifice plate 134 displaces toward the outlet end 136 of the flow sensor 128, it will first activate the first stage Reed switch 160, enunciating the internal first stage trouble alarm 162. As the orifice plate 134 continues to be displaced towards the outlet end 136, it will next activate the fire alarm Reed switch 146, which enunciates the alarm means 26, preferably notifying emergency response personnel. The delta "d" (i.e., the linear displacement of the fire alarm Reed switch 146 and the first stage Reed switch 160) will be set in the field so that there is sufficient differential in the flow which activates the first stage alarm and the fire alarm to give residents or occupants of the structures sufficient time to shut off domestic demands before a fire alarm is created. This two-stage system also serves as a safety back up, because if one of the alarm stages fail, the other will still alert residents to the potential alarm condition.

alarm stages

## United States Patent

### Young

(10) Patent No.: US 6,333,689 B1  
(45) Date of Patent: Dec. 25, 2001

#### (34) APPARATUS AND METHOD FOR WATER FLOW FIRE ALARM

Inventor: Richard Young, 9709 Winding Oak Dr., Oklahoma City, OK (US) 73151

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No. 09/450,535

(22) Filed: Nov. 30, 1999

Related U.S. Application Data

(33) Continuation-in-part of application No. 09/098,976, filed on Jun. 17, 1998, now Pat. No. 6,081,196.

(31) Int. Cl. G08B 29/00; G08B 21/00; A62C 37/36

(32) U.S. Cl. 137/87.04; 137/84.4; 169/37; 169/61; 116/267

(38) Field of Search 340/507-611, 618; 137/115.01, 115.06, 116.5, 87.04, 87.03, 544; 169/23, 60, 61, 90, 37; 116/264, 267, 268

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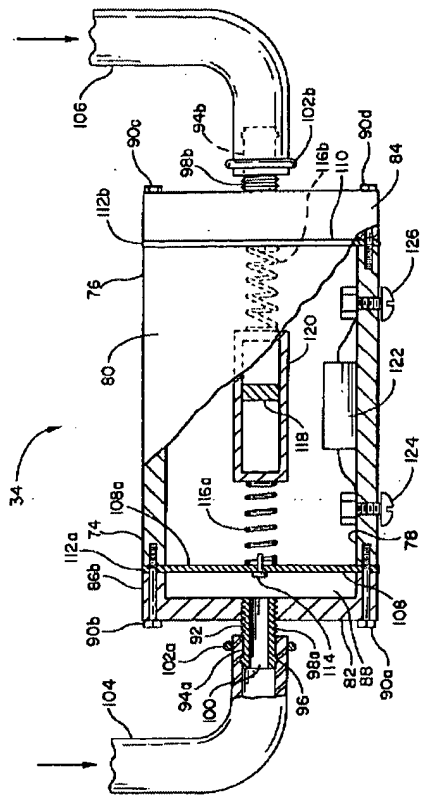
\* cited by examiner

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#### ABSTRACT

An apparatus and method for a flow-based fire alarm. A bypass system is provided to allow sufficient water flow where a pressure drop, particularly in a residential or multi-purpose piping system such as a water softener is encountered, by providing an alternate, lower pressure flow path allowing additional flow when the pressure drop through the system becomes too great. Flow detection means are also provided with minimal pressure drop to insure that flow for fire protection need is not unduly restricted. The flow detection means includes either a differential pressure switch coupled to an orifice plate or a moving orifice plate having thereon a magnet, which communicates with a Reed switch incorporating all of the elements discussed provides multiple levels of security for a fire protection system for use in a residence or other structure.

8 Claims, 8 Drawing Sheets





Document ID	Pages	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	122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